Table 17. Wolman pebble count fines in spawning habitat (USFS 1999).

Stream/Reach	Percent Fines (particles <6mm)	Approximate Percent Egg to Fry Survival
Clear Creek reach 1-upper reach	42	<25
Clear Creek reach 1-upper reach	54	12
Clear Creek reach 2-upper reach	40	<25
Clear Creek reach 3-upper reach	43	<25
Clear Creek reach 3-upper reach	43	<25
Clear Creek trib B reach 1-upper reach	38	<25
Clear Creek trib B reach 2-upper reach	61	0
Clear Creek trib B reach 2-upper reach	52	16
Clear Creek trib C reach 1-upper reach	81	0
Clear Creek trib C reach 1-upper reach	48	<25
East Fork Clear Creek reach 1	26	68
East Fork Clear Creek reach 3	76	0
East Fork Clear Creek trib A	30	60
East Fork Clear Creek trib B	18	> 80
East Fork Clear Creek trib B	19	>80

- approximate egg to fry survival determined using Tables A.1, E.2, E.3, and Figure II.C.23 in Chapman and McLeod (1987)

Table 18. Percent Fines in Clear Creek Rosgen B Channel Type(DEQ).

Stream ID	Stream	Percent Fines
2002SBOIA023	Clear Creek –Upper Reach	43
1996SBOIB065	Clear Creek-Upper Reach	37
1996SBOIB064	Clear Creek-Middle Reach	44

Bank Stability

Unconsolidated bank material makes the stream vulnerable to sedimentation from channel erosion. The critical period for sediment delivery from channel erosion is during runoff and large precipitation events. While bank angles are fairly steep, the banks were all greater than 82% stable, indicating that bank erosion is likely not contributing excess sediment to this section. The majority of banks measured were 100% stable (Table 19). Notes from surveys in 1997 and 1998 also indicate little channel instability (USFS 1999).

Width-to- Depth Ratio

Width-to-depth (w:d) ratio provides a dimensionless index of channel morphology, and can be an indicator of change in the relative balance between sediment load and sediment transport capacity (see page 71 for a more detailed description). W:d values near or below natural condition values at all surveyed reaches in Clear Creek indicate that despite elevated fines, scour pool dimensions are similar to those seen in pristine streams (Table 19).

Pools Per Mile/Large Woody Debris

Trees provide shade and streambank stability because of their large size and massive root systems. As trees mature and fall into or across streams, they not only create high-quality pools and riffles, but their large mass also helps to control the slope and stability of the channel (Platts 1983). This large woody debris (LWD) influences sediment transport in streams by forming depositional sites (Megahan and Nowlin 1976). In many aquatic habitats, if it were not for the constant entry of LWD into the streams, the channel would degrade and soon flow on bedrock, leaving insufficient spawning gravels and few high-quality rearing pools for fish (Platts et al. 1987). LWD is one of the most important sources of habitat and cover for fish populations in streams, as well as pool forming agent in small streams (MacDonald and others 1991).

Current habitat data indicate pool number and LWD levels in area streams exceed those seen in pristine streams (Table 19).

Table 19. Fish Habitat Conditions: Upper Reach Clear Creek (USFS 1999).

Stream Reach	Pools per mile	LWD/mile	Mean bank stability (%)	Mean Width/Depth Ratio
Rosgen Channel Type A				
Overton (1995) Reference Conditions	**10.8**	**225.2**	**96**	**19**
Clear Creek Tributary B	159.5	669.7	99.8	21.5
Rosgen Channel Type B				
Overton (1995) Reference Conditions	**74.9**	**219.9**	**88**	**27**
Clear Creek Reach 2	173.3	409.7	100	16.5
Clear Creek Tributary B, Reach 1	132.5	264.9	93.4	15
Clear Creek Tributary C, Reach 1	231.4	231.4	100	16.5
Clear Creek Tributary C, Reach 2	141.8	283.7	100	22.6
East Fork Clear Creek, Reach 1	235	407.3	82.9	34
East Fork Clear Creek Tributary B, Reach 1	237.3	533.9	100	25.5
East Fork Clear Creek, Reach 3	147	368	100	12.1
East Fork Clear Creek Tributary A, Reach 1	91.2	243.3	100	12.4
East Fork Clear Creek Reach 2	110	94	99	15.8
Rosgen Channel Type C				
Overton (1995) Reference Conditions	**65.1**	**222.7**	**84**	**28**
Clear Creek Reach 1	170.8	264	0	13.7

Sediment Delivery from Roads

Although all roads are potential sediment sources, those directly adjacent to streams are of the greatest concern. Roads that are located near meandering low gradient channels often disconnect the channel from its adjacent floodplain and result in bank cutting during higher flows. Roads in the Clear Creek watershed are close to the stream channel in several places and there are at least 30 road crossings in the watershed. Due to the proximity of roads to the stream channel, Clear Creek is vulnerable to excess sedimentation.

Table 20 shows estimates of the annual sediment contribution attributable to roads. Tables 21 and 22 show DEQ water body assessment scores and USFS summary information, respectively. BOISED modeling estimates that road-related sediment is currently being delivered to streams in the middle and upper watersheds at 21% over background rates.

A sediment TMDL for the middle and upper Clear Creek reaches will be developed by using BOISED results for the East Fork Clear Creek as reference conditions for the rest of the watershed. The tributaries to the East Fork and the lower East Fork Clear Creek reach had low percent fines and roads are within close proximity in these areas.

In the Fall, 2004, data was collected to provide ground truthed input to GEO WEPP, another sediment delivery model. However, permission from the main private landowner (Boise Cascade was the owner in 2004 and did not allow DEQ access for sediment delivery data collection) is needed to obtain important data on delivery distance and slope to the stream in order to accurately run the model. This modeling effort would provide more specific, detailed information for implementation on where to focus sediment delivery reduction efforts.

Table 20. Clear Creek Sediment Yield (USFS 1999).

Stream Reach	Watershed Size	Percent over Natural Sediment Yield	Road Related Sediment (tons/year)
West Fork	1327	35	32.4
North Fork	923	27	12.6
Long Prong	1346	10	13
Upper Clear	2811	14	29.1
Upper Main Forest Service	689	11	6.3
East Fork	3170	12	16.8
Upper Main Boise Cascade	5276	33	76.1
Upper East Mountain	571	12	2.7
East Mountain	581	45	11.9
6th field watershed			
Upper Clear Creek	16693	21	200.9

Table 21. Clear Creek: DEQ Water Body Assessment Scores.

Stream ID	SHI	SMI	SFI	Water body Assessment Score	Beneficial Use Support Status
1994SBOIA062	1	3	No data	2	Full Support
1996SBOIB065	No data	3	No data	Not Assessed	Not Assessed
2002SBOIA023	2	2	3	2.33	Full Support

Table 22. 2002 Clear Creek Stream Summary Information (USFS 2003).

Stream	Reach	Sinuosity	Stream Density (km/km^2)	Riparian Road Density (km/km^2)	# road crossings
Clear Creek	127-01-I-I1-02	1.2	1.34	0.6	30

Macroinvertebrate Data

The River Invertebrate Prediction and Classification System (RIVPACS) Score describes the similarity of the invertebrate species composition at a site to the species composition found at similar *reference sites*. The model was developed using 112 reference sites and all values below a threshold of 0.78 have a high probability of being biologically impaired. As seen in Table 23, the RIVPAC score for Clear Creek is above the 0.78 threshold, indicating a low probability of impairment (USFS 2003).

Table 23. Macroinvertebrate Data for Clear Creek (USFS 2003).

Taxa Richness	# Clinger Taxa	# Long Lived Taxa	# of Ephemeroptera Taxa	# of Plecoptera Taxa	# of Tricoptera Taxa	Community Tolerance Quotient	RIVPAC's Score of Observed / Expected
47	23	6	14	6	8	61	1.05

Riparian Vegetation

The Greenline Ratings in Table 24 below are calculated by looking at the percent cover of plant community types. The ratings in this table indicate that riparian cover is good for this particular reach of stream.

Table 24. Greenline Riparian Monitoring Results for Clear Creek (USFS 2003).

Stream	Greenline wetland rating	Greenline Successional rating (% late seral)	Effective Ground Cover (%)
Clear Creek	93	99	100

Fisheries

The Idaho Department of Fish and Game has determined that the wild rainbow trout found downstream in the Cabarton reach of the North Fork Payette River, 2-3 miles downstream of the mouth of Clear Creek, spawn in Clear Creek in the spring (Anderson and others, 1987). However, brook trout are the predominant species in the watershed. DEQ data indicate that the upper watershed supports a healthy fishery. DEQ found mainly brook trout and sculpin in their 2002 stream inventory.

Temperature Data

Upper Clear Creek does not exceed the cold water aquatic life temperature standard and also meets USFS guidelines for migratory and rearing temperatures (Table 25).

Table 25. 2002 Clear Creek Temperature Data (USFS, unpublished data)

Stream	Reach ID	Daily Average Temperature >19°C	Daily Average Temperature Impairment	# of Days Reported	Daily Maximum Temperature Impairment
Clear Creek	127-01-I-I1-02 (downstream end of Upper Reach)	0	Unimpaired	43	Unimpaired

Spawning temperatures are likely met due to spring and fall spawning by rainbow and brook trout, respectively, and corresponding cool seasonal temperatures. Stream temperatures in upper reaches and tributaries, observed riparian shading, shade density data, and fish presence/absence surveys indicate areas of thermal refuge are available and may be used by resident fish species.

Middle Reach

Biological/Habitat Data

The middle reach is comprised of primarily private land from the Forest Service boundary at Road 409 to where the Clear Creek Road stops paralleling the stream (Figure 57). DEQ was denied access to the majority of this reach. USFS BOISED results were used to determine a TMDL sediment allocation based on reference conditions in the East Fork Clear Creek watershed. Table 20 has sediment delivery results for Upper Main Boise Cascade and East Mountain Roads which are located in this reach.

DEQ conducted a partial habitat inventory in 1996, which indicated that the stream had a diverse macroinvertebrate community (Table 26). USFS habitat inventories indicate that this reach has elevated fines and low amounts of woody debris (Table 27). This reach is located in a meadow area, which may contribute to the low amount of woody debris. Width/depth ratios, stream width, pool frequency, bank stability and temperature are all within acceptable ranges.

Table 26. Middle Reach Clear Creek: DEQ Water Body Assessment Score.

Stream ID	SHI	SMI	SFI	Water Body Assessment Score	Beneficial Use Support Status
1996SBOI064	Not Assessed	3	Not Assessed	Not Assessed	Not Assessed

Table 27. Clear Creek: Sites Above and Below the Ditch Creek confluence (USFS 2002 unpublished data).

Habitat Parameter	Site Above	Site Below	Overton Reference Criteria
Stream Width	21.5 ft	22.4 ft	25 ft
Pool frequency /mi	46	62	47
Water temp. (C)*	17	17	<15 C max.; < 9C avg.
LWD /mi	0	0	220
Bank Stability (%)	92 (non-forested)	83 (non-forested)	>80
W:D ratio	32	22	27
WPC (%) fine sediment	--	66%	Rosgen 'B'; Plutonic Mean = 23%

Fisheries

Table 28 shows the fish found in a survey in the middle reach of Clear Creek. The combination of increased stream temperatures from highly reduced summer stream flows in the lower reach, and the unscreened irrigation headgate immediately downstream of national forest lands are maintaining losses to juvenile fish populations both upstream of this diversion and in the dewatered lower segment.

Table 28. Fish Presence/Absence Snorkeling (USFS 2002)

Species	Clear Ck 'Above confluence with Ditch Creek'		Clear Ck 'Below confluence with Ditch Creek'		Ditch Ck. Mainstem		Ditch Ck 'North Fork'	
	# fish	#/100m²	# fish	#/100m ²	# fish	#/100m ²	# fish	#/100m²
Rainbow Trout	17	4.15	35	4.99	2	3.06	2	3.25
Brook trout	0	0	0	0	16	6.75	27	11.7
Young-of-the Year	Present		44	6.28	---		----	

Lower Reach

The lower reach is delineated as the section of Clear Creek from where the Clear Creek road no longer parallels the creek to the mouth (Figure 57). Channel erosion was surmised to be the greatest contributor of sediment in this reach because the road does not parallel or cross the creek as frequently as in the middle and upper reaches. Channel erosion inventories were done in the summer of 2004. The section between the upper end of the reach and Highway

55 was determined to be stable. Evidence of bank erosion during peak flow events is evident, but overall banks were >80% stable, and damaged areas appeared to be healing (USFS 1999).

Below Highway 55, banks were <80% stable with the exception of the reach at the mouth of the creek. Over-widened channels exist throughout most reaches, except at the upstream section of the lower reach. Excessive sand, past livestock over-utilization of riparian areas, and diverted flows seem to be the main causes of streambank instability. Regeneration of shrub species is limited within most of the reaches assessed. Flow alteration, erosion from roads, channelization, streambank damage by livestock, and low stream gradient areas that tend to allow settling all contribute to excess percent fines.

Conclusions

Clear Creek is on the 303(d) list for sediment. In the upper reaches, elevated percent fines are present but do not appear to be degrading pool quality as shown in width maximum depth ratios that are similar to pristine streams in similar areas. Bank stability and riparian area measurements indicate that bank erosion is not a significant source of sediment. The percent fines exceed the Natural Conditions Database values found in suitable fish rearing and spawning habitats in pristine streams (Overton and others, 1995). Elevated percent fines in the stream channel, as well as ongoing activity in the watershed that could contribute excess sediment to the stream, necessitate the development of a TMDL to restore beneficial uses in lower Clear Creek and ensure that beneficial uses continue to be supported throughout the rest of Clear Creek.

The middle reach of Clear Creek is delineated as the section from just downstream of the USFS managed public land to where the road stops paralleling the creek below the Alpha Ditch. This area has grazing, timber, and road management activities associated with it. Sediment delivery from roads and channel erosion may both be factors in sediment delivery. DEQ focused on roads because the roads appeared to be the predominant source of erosion, but, also, DEQ was denied access to Clear Creek to evaluate the channel. Thus, contributions from channel erosion are not determined. BOISED modeling results show that a TMDL for sediment is necessary.

Channel erosion inventories were conducted in the lower reach of Clear Creek. The section from the lower boundary of the middle reach of Clear Creek to Highway 55 was greater than 80% stable. The section from Highway 55 downstream to the mouth of Clear Creek was predominantly <80% stable. Bank erosion is contributing excessive sediment to Clear Creek and a TMDL is necessary. Sediment allocations upstream will also improve the water quality in lower Clear Creek.

Elip Creek

Elip Creek is an intermittent first order tributary to Twah Creek that flows into the North Fork Payette River above Big Payette Lake (Figures 59 and 60). Elip Creek originates in forested land at 5,800 feet and flows for less than 1.5 miles before emptying into Twah Creek in a meadowed area at approximately 5,100 feet. Twah Creek supports a brook trout fishery. Elip Creek is located entirely on state land. The creek shows Rosgen channel type A, B and C characteristics.

Twah Creek had a significant amount of timber harvested in the 1990's relative to the other subwatersheds found in the Upper North Fork Payette River area (1,355 acres). The Twah Creek watershed was not burned in the 1994 fires. Timber harvest was primarily by tractor skidding. A portion of this timber harvest was estimated to have occurred within 50 feet of Twah Creek. No management induced landslides have occurred in the Twah Creek watershed as a result of timber harvest or road building activity.

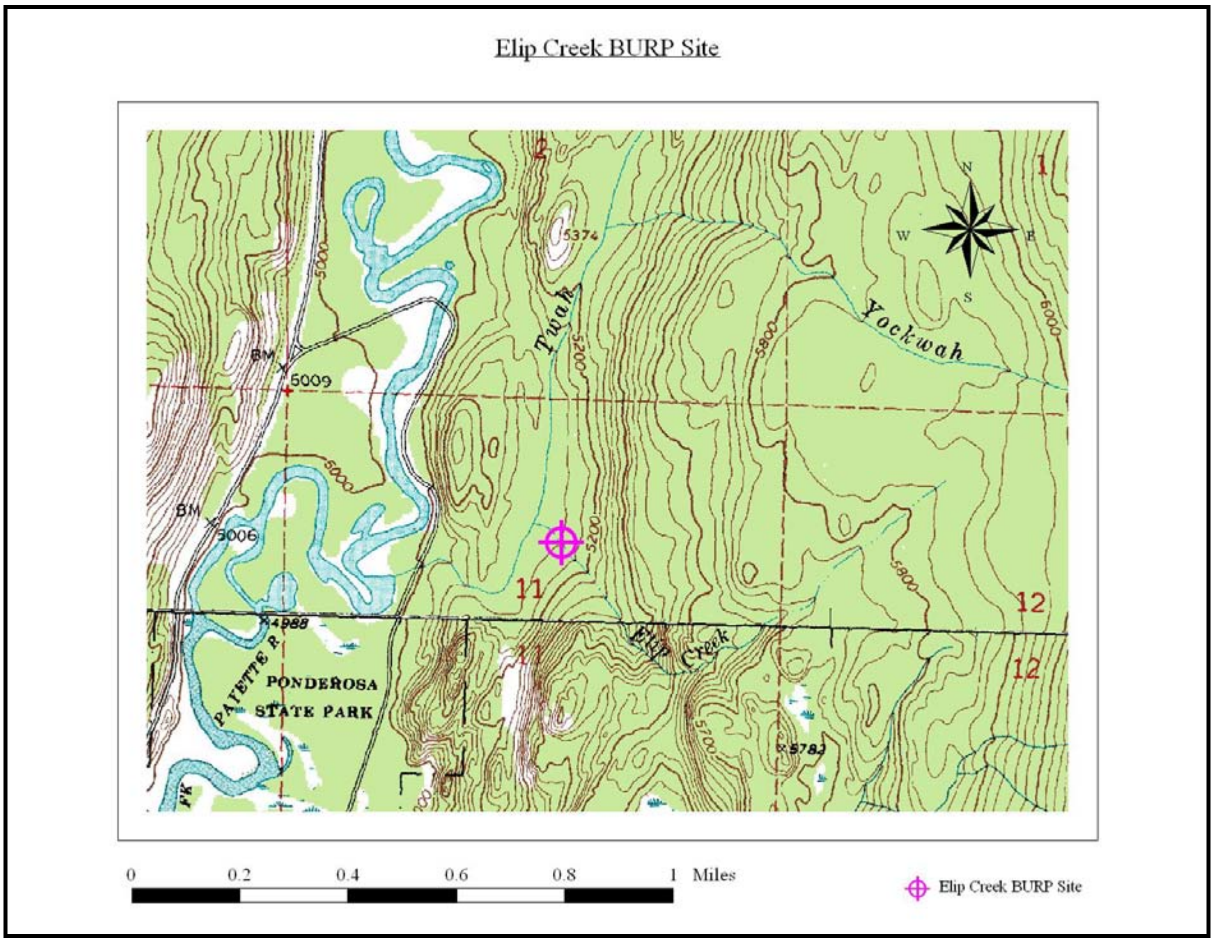

Figure 59. Elip Creek Hydrology and Monitoring Sites.

Figure 60. Elip Creek.

In the meadow area where Elip Creek enters Twah Creek, thistles are not only found throughout the meadow but also are encroaching into the riparian area. While this is not necessarily a water quality concern, the displacement of more desirable riparian species is of concern.

Flow Characteristics

The flow in late July 1995 was 1.59 cfs. Elip Creek appears to flow through the summer in some years and not in others. Elip Creek was dry in 2003 when the DEQ stream inventory crew surveyed it. In early August 2004, DEQ staff found standing water but no significant flow in the meadow area. In late October 2004, DEQ staff noted flows < 1cfs in Elip Creek following a period of heavy rain.

Biological/Habitat Data

In 1995, a DEQ stream inventory crew surveyed Elip Creek and found that beneficial uses were not impaired (the SMI and SHI ratings were both 3, the highest score; no electrofishing took place, so an SFI could not be calculated). The percent fines score was 10%, although the stream inventory crew noted that the substrate had a high percent embeddedness. Streambanks were 100% stable and riparian canopy closure was high.

Conclusions

Elip Creek is listed for an unknown pollutant on the 1998 303(d) list. Lack of flow, not a specific pollutant, appears to limit stream habitat in Elip Creek. Beneficial uses were not impaired when Elip Creek was surveyed when flowing water was present and, thus, a TMDL is not necessary.

Fall Creek

Originating at 7,809 feet, Fall Creek is in a 4,210 acre forested watershed in central Idaho managed for timber production (Figures 61 and 62). From its headwaters, Fall Creek flows 4.8 miles before entering Payette Lake at 4,990 feet approximately 3.5 miles outside of McCall, Idaho. A portion of Fall Creek originates as spillover from Blackwell Lake, a small regulated glacial lake located in the upper third of the watershed. Land ownership is public and is primarily managed by the U.S. Forest Service (Payette National Forest) and to a lesser extent by the Idaho Department of Lands (IDL).

Fall Creek is a 3rd order tributary to Payette Lake with a dendritic stream feeder pattern. The drainage is oriented in a southwest direction with side tributaries entering mostly from the east and north (IDL 2003d).

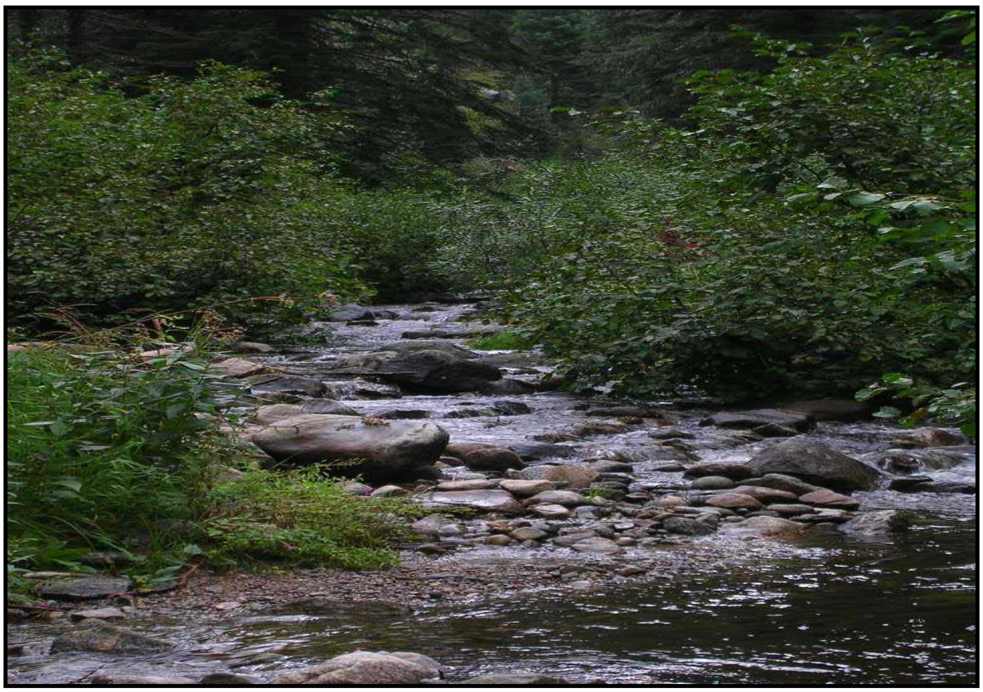

Figure 61. Fall Creek: Lower Reach.

The Fall Creek drainage is predominantly underlain by highly and weakly weathered granitic rocks of the Idaho Batholith. To a lesser extent, the drainage is underlain with loess at the mouth of Fall Creek. This granite rock is typically divided, with the highly weathered material occurring along the lower elevations and dominating the main stem floodplain and lower tributary flood plains. The weakly weathered material occupies the uplands and ridgelines (IDL 2003d).

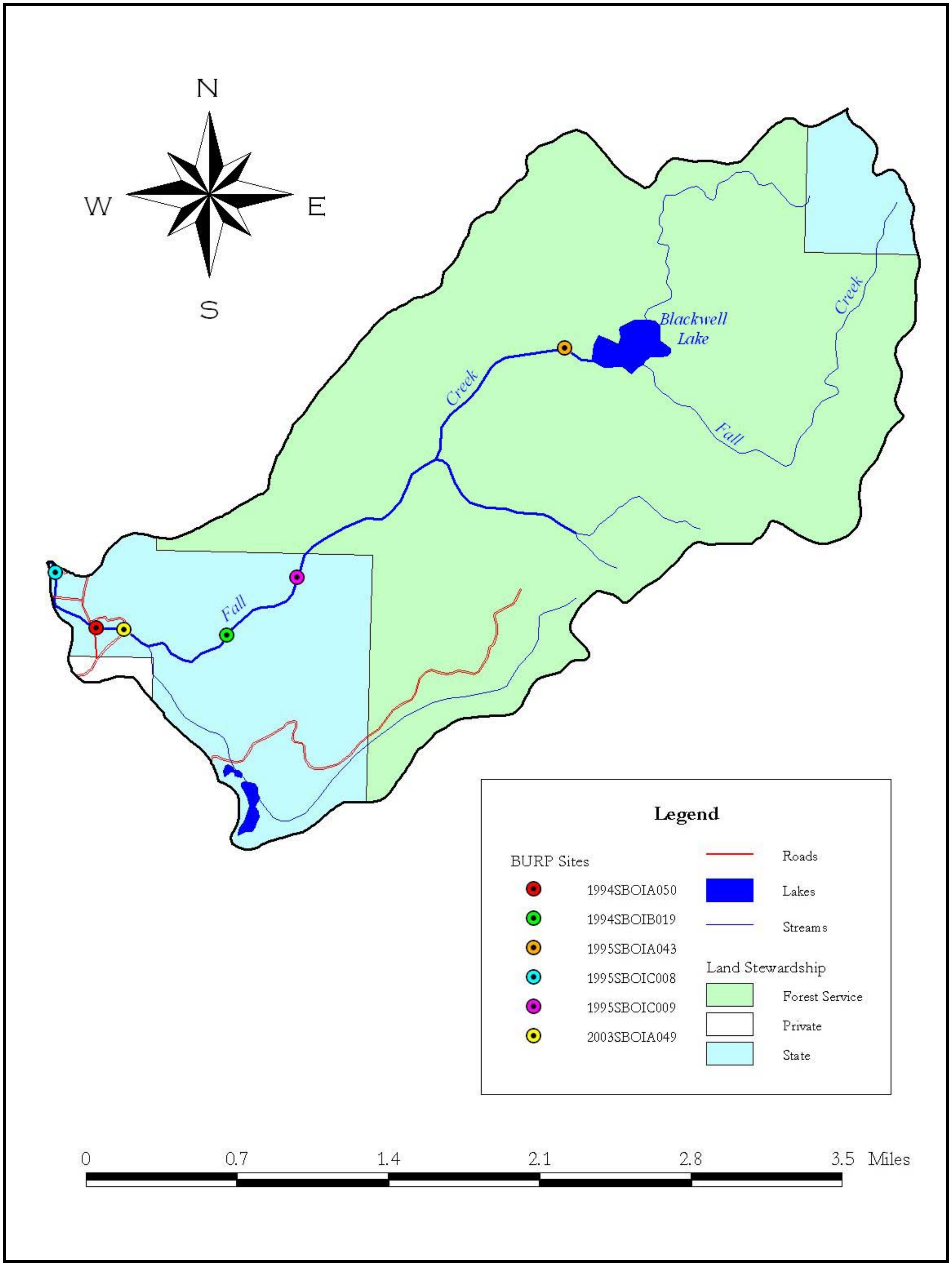

Figure 62. Fall Creek Hydrology, Land Ownership and Monitoring Locations.

Rainbow trout, brook trout, sculpin and cutthroat trout are found in Fall Creek. Kokanee salmon spawn in Fall Creek in the fall months.

Some recreational camping and off road vehicle riding occurs near the mouth of Fall Creek.

Flow Characteristics

Fall Creek flows generally peak in May, corresponding to snowmelt, and remain high through mid-June (Figure 63). Base flows occur in October and November (IDEQ 1997).

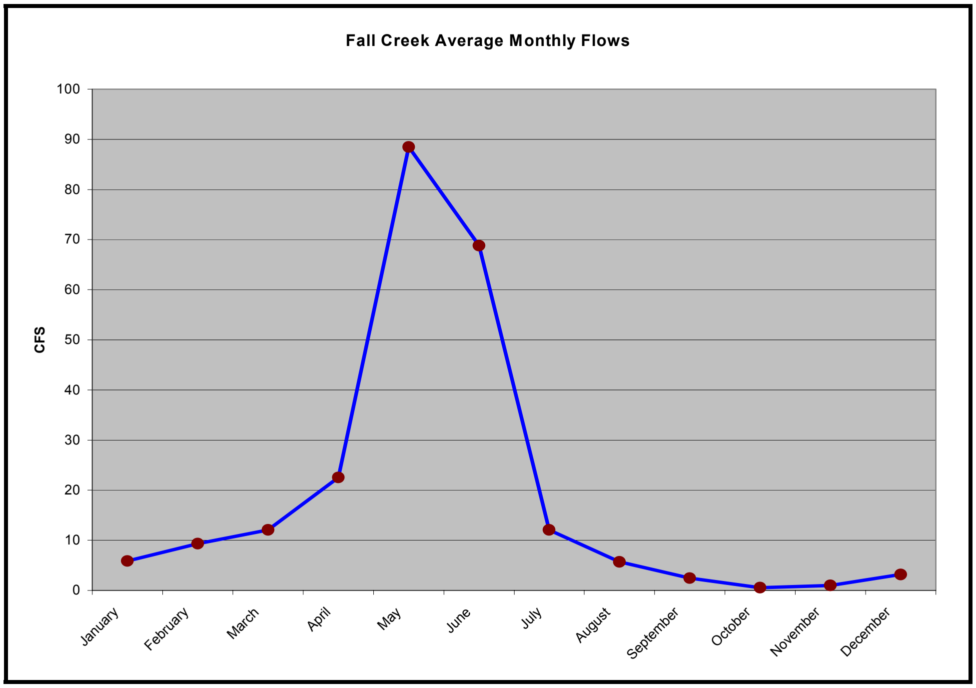

Figure 63. Fall Creek Average Monthly Flows.

Water Column Data

Fires occurred in 1994 in the headwaters of Fall Creek. The fire caused extensive tree mortality and burned most of the ground cover. Field observations indicated that the riparian area burned and resulted in streambank destabilization (IDEQ 1997). Sediment delivery from overland flow sites was also evident throughout the headwaters. The first year after the wildfire, total phosphorus concentrations were very high during runoff (2.062 mg/L and 1.003 mg/L). By the second season, total phosphorus concentrations were only slightly higher than the similar and unburned Deadhorse Creek in the watershed (eighteen times lower than the year before) as shown in Figure 64. Sediment concentrations also decreased but not by as large a magnitude (Figure 65).

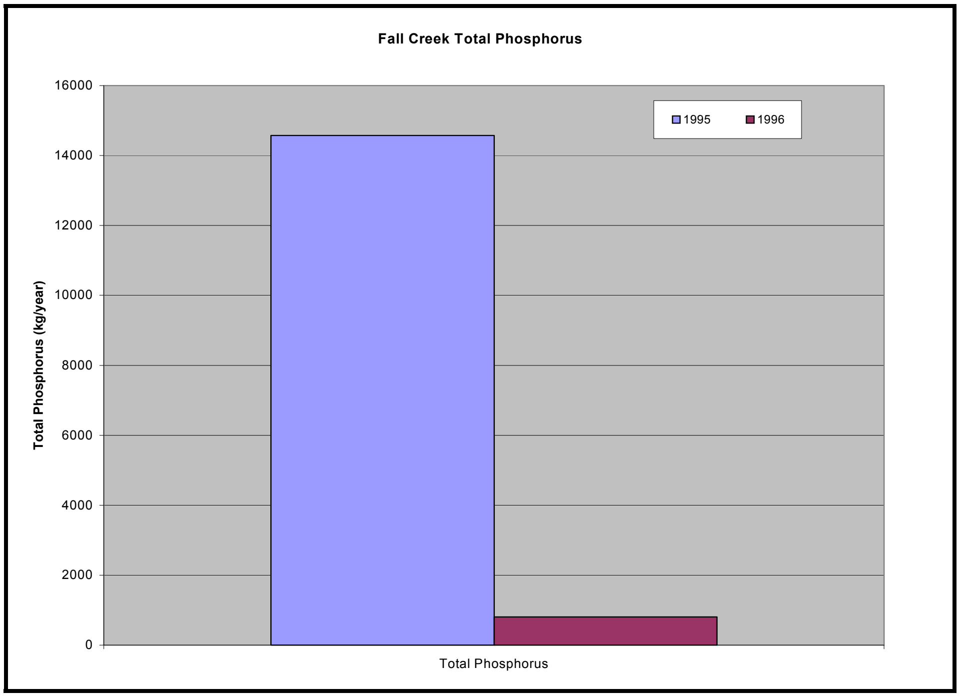

Figure 64. Fall Creek 1995/1996 Total Phosphorus Concentrations.

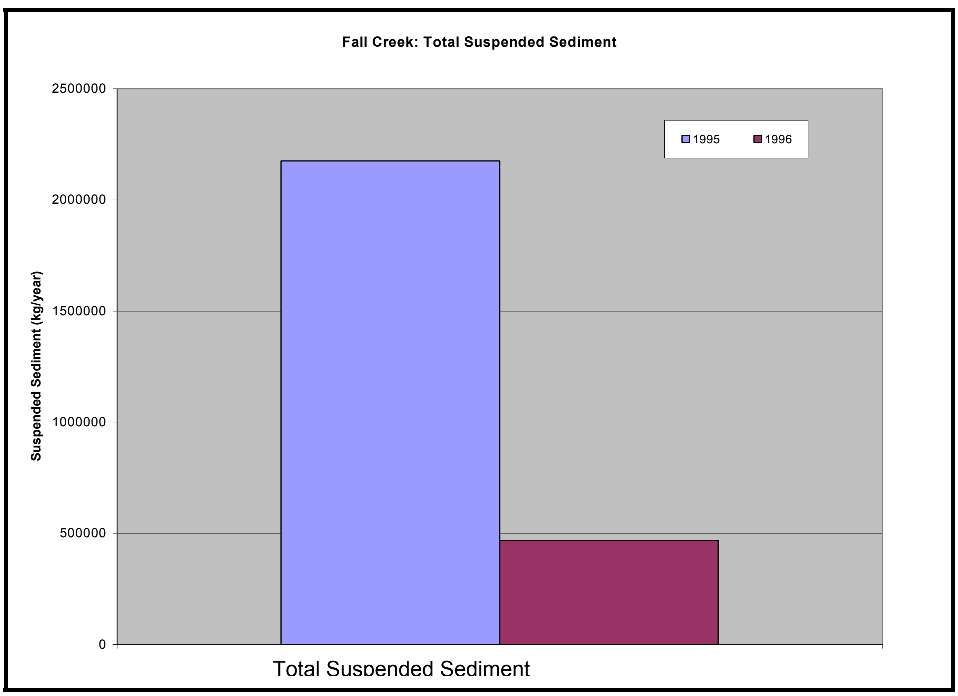

Figure 65. Fall Creek 1995/1996 TSS Concentrations.

Biological/Habitat Data

The most recent DEQ stream inventory data shows that beneficial uses in Fall Creek are not impaired (Table 29). The 1995 inventory was taken a year after the Blackwell fire.

Table 29. Fall Creek: DEQ Water Body Assessment Scores.

Stream ID	SHI	SMI	SFI	Water Body Assessment Score	Beneficial Use Support Status
1994SBOIA050	1	3	3	2	Full Support
1994SBOIB019	1	3	No data	2	Full Support
1995SBOIA043	No data	2	1	1.5	Not Full Support
1995SBOIC008	1	3	No data	2	Full Support
1995SBOIC009	2	2	No data	2	Full Support
2003SBOIA049	3	2	3	2.67	Full Support

A Cumulative Watershed Effects (CWE) assessment (IDL 2003d) identified some bank sloughing, reduced vegetative bank protection, moderate bank rock content, some bank cutting, lack of large organic debris, channel bottom movement and channel bottom rock shape/roundness, all contributing to the moderate rating (Table 30).

2004 DEQ channel erosion inventories of Fall Creek showed only slight erosion in the lower reach. Overall, banks were greater than 85% stable in the lower and middle reaches.

Table 30. 1995 Fall Creek Channel Stability Index (CSI) Ratings (IDL 2003d).

Reach	CSI Rating
Fall Creek 1	Moderate
Fall Creek 2	Moderate

A CWE study showed that roads had a low potential for sediment delivery to Fall Creek. Road closures have also occurred in this drainage, with most roads in the watershed permanently closed to vehicular traffic with the exception of snowmobiles, protecting the creek from excess sediment delivery. Skid trails have been obliterated.

Timber harvest has occurred and continues to occur in the Fall Creek drainage with the most recent harvest occurring in 2000 and 2001. However, stream buffers and erosion control measures on skid trails that are in compliance with the Forest Practices Act are effective in protecting the stream from excess sediment delivery (IDEQ 1997). DEQ (1997) estimated that during the 1980s timber harvest occurred within 50 feet of the stream and sediment was delivered to the stream. Fall Creek has also had one management caused landslide due to a road failure that delivered sediment to the stream.

Temperature Data

Fall Creek is listed for temperature on the 303(d) list. Summertime temperatures in Fall Creek do not exceed the state standard of 19°C maximum daily average. Rainbow trout spawning and egg incubation occurs in the time period between March 15th-July 15th and is triggered by temperature and flow considerations. Kokanee spawning occurs in fall, usually after September 1st, and the spawning/incubation period is defined as the period between September 1st – May 1st. Spawning is generally triggered at temperatures above 6-9°C. In order to meet the salmonid spawning criteria, temperatures recorded during the March 15th-July 15th window must not exceed the 9° C daily average standard in more than 10% of the days in that period. As shown in Figure 66, the spawning criteria are not met during this time period.

There are both historic anthropogenic and natural factors that have limited the potential of the riparian area, particularly the Blackwell Fire. Currently, the Forest Practices Act is followed, and while there may be some sediment delivery and riparian degradation association with recreational vehicles, those effects are localized and appear minimal. Recovery is still occurring, and temperature does not appear to be greatly affected by anthropogenic influences at this time. Using aerial photos, pre and post burn vegetative cover were compared. A shading target of 85% was developed using shade curves for similar Douglas Fir-Grand Fir vegetative community types by averaging results for streams of a similar width and aspect from these TMDLs: the Walla Walla, Willamette, Mattole and South Fork Clearwater TMDLs. Since the riparian canopy is not yet at the target cover amount, a TMDL was established to help achieve salmonid spawning criteria.

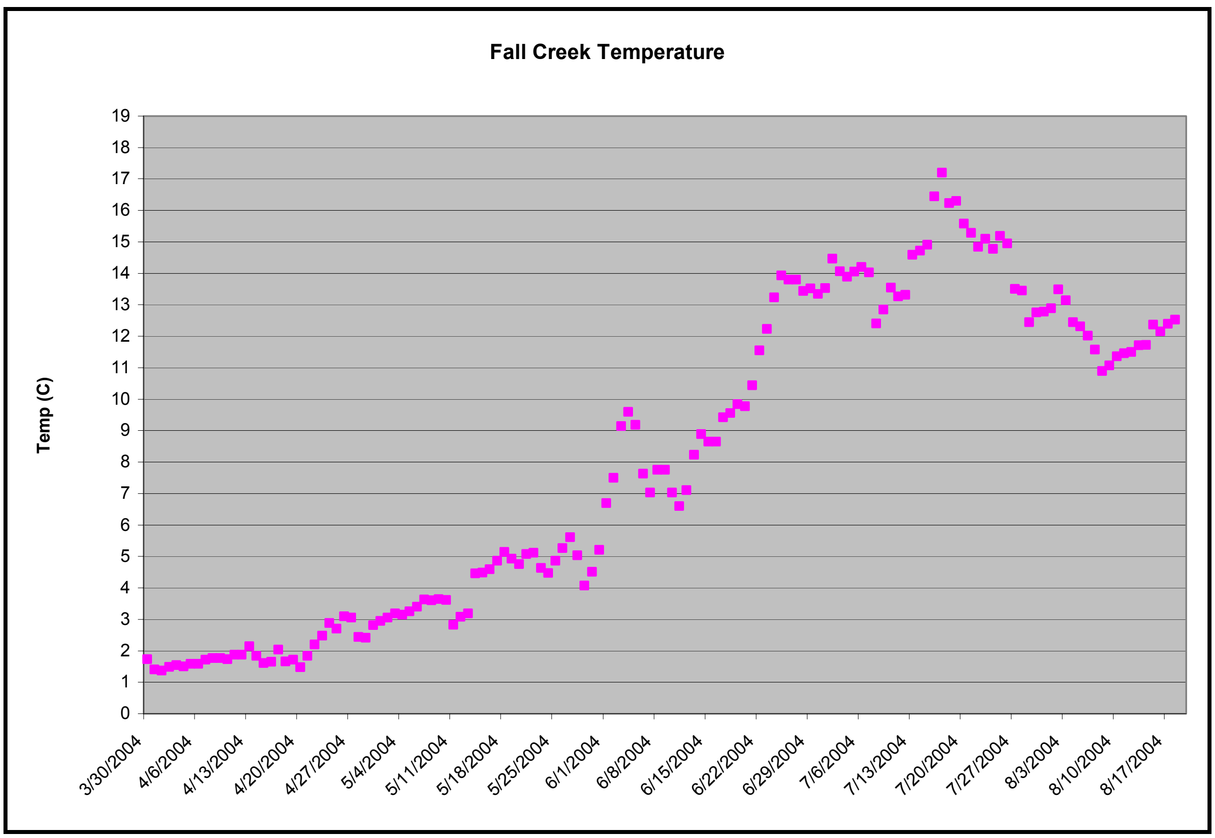

Figure 66. Fall Creek Temperature 2004 (DEQ data).

Conclusions

Fall Creek is listed for temperature on the 1998 303(d) list. Recovery has occurred in this watershed and beneficial uses are not impaired with the exception of cold water aquatic life uses during salmonid spawning season. Instream temperatures during the salmonid spawning season do not meet the temperature criterion. Stream protection protocols are in place and the exceedances of the salmonid spawning criteria appear largely attributable to the results of the Blackwell Fire. Recovery continues to occur and should continue to contribute to lower temperatures. Using aerial photos, pre and post burn vegetative cover were compared. A shading target of 85% was developed using shade curves for similar Douglas Fir-Grand Fir vegetative community types by averaging results for streams of a similar width and aspect from these TMDLs: the Walla Walla (ODEQ 2004b), Willamette (ODEQ 2004a), Mattole (CRWQCB 2002) and South Fork Clearwater (IDEQ 2002) TMDLs. A TMDL was determined for Fall Creek for salmonid spawning temperatures.

Landing Creek

Landing Creek is a 2nd order stream that flows into Deadhorse Creek, which is a tributary to Big Payette Lake (Figures 67 and 68). Originating at 6,500 feet, Landing Creek flows 2.42 miles entirely through forested land and shows Rosgen Channel Type A, B, and C characteristics. The predominant species of fish is brook trout.

The majority of precipitation occurs as winter snowfall and spring rain. High-volume runoff occurs during spring snowmelt and major rain-on-snow events. Lower elevations support a mixed conifer forest stand with Douglas fir, hemlock, western larch and tamarack, with inclusions of Englemann spruce near streams and wetter areas. The presence of lodgepole pine, subalpine fir and pockets of spruce increases with elevation and effective precipitation (IDL 2003). Timber harvest occurs in this watershed.

Figure 67. Landing Creek.

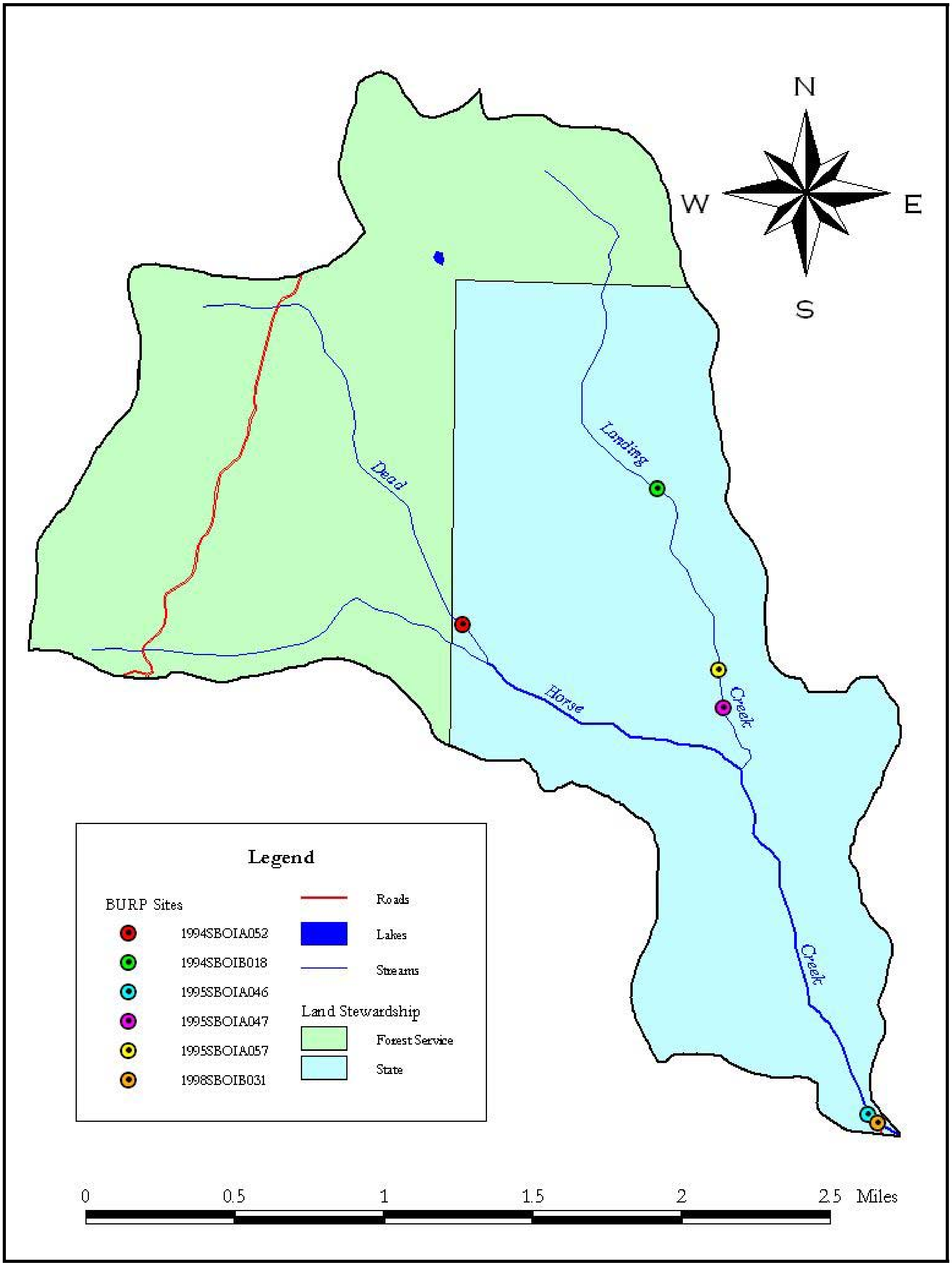

Figure 68. Landing Creek Monitoring Sites.

Flow Characteristics

Hydrology information was not available for Landing Creek, but a hydrograph was available for Deadhorse Creek, which Landing Creek flows into (Figure 69). While flows are less in Landing Creek, the runoff pattern is likely similar (IDEQ 1997).

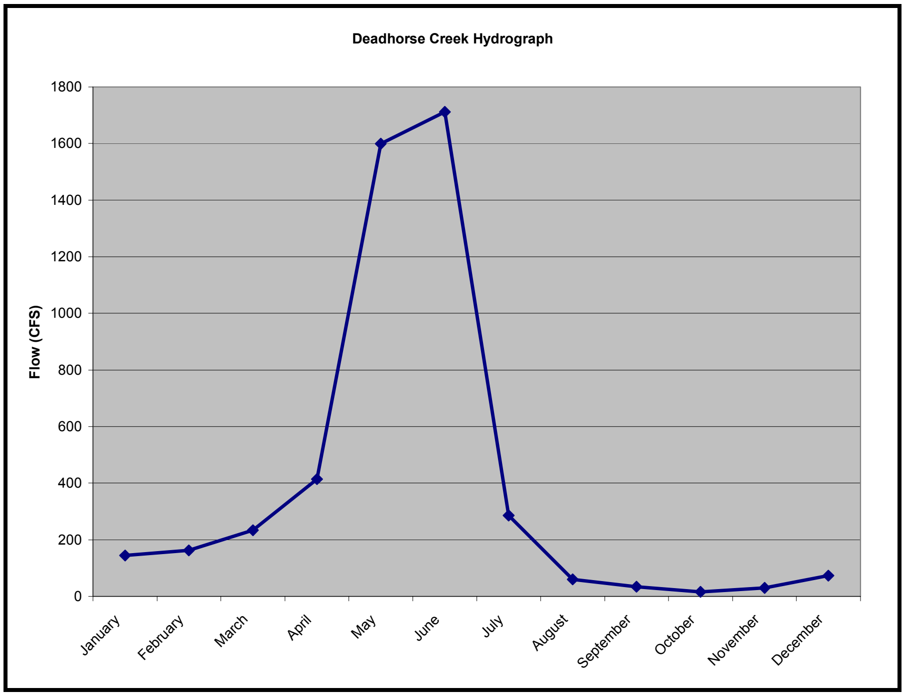

Figure 69. Deadhorse Creek Average Monthly Flows.

Water Column Data

The Landing Creek watershed did not burn in the 1994 fires. However, large sediment loads were measured in 1995 in Deadhorse Creek, but these decreased in 1996 (Figure 70). Timber harvest that included road building occurred from 1997-99 and in 1993-94 in the Landing Creek watershed. Instream nutrient concentrations remained low both years (averaging <0.02 mg/L), which is consistent with the area being unburned. In terms of loading figures, Deadhorse Creek was estimated to have delivered 198 kg/TP to Big Payette Lake in 1995 while Fall Creek (burned watershed) was estimated to have delivered 14,571 kg/TP. Both watersheds were estimated to have delivered 2.17 million kg/suspended sediment to Big Payette Lake in 1995.

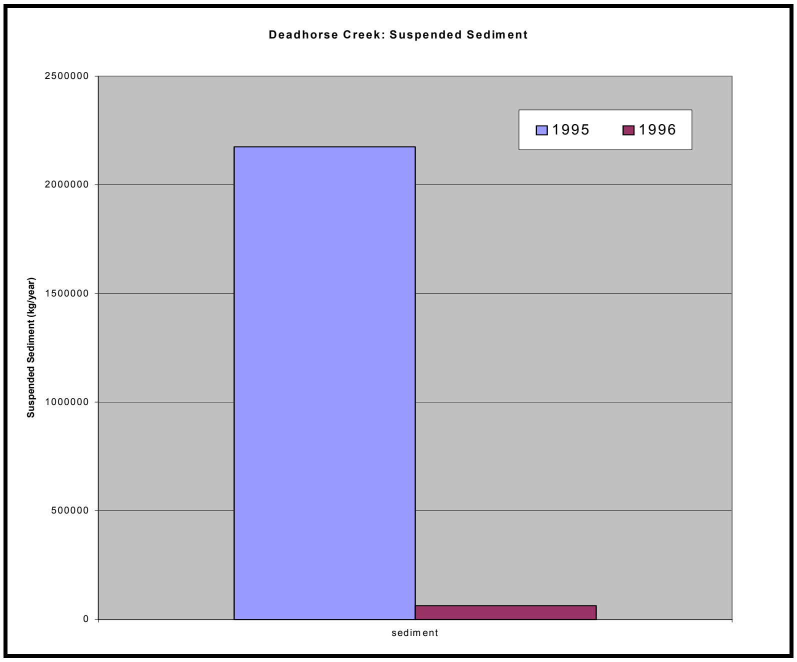

Figure 70. Deadhorse Creek Sediment Concentrations: 1995/1996.

Temperature Data

A temperature logging device was installed in Landing Creek during the 2004 spring salmonid spawning season (Figure 71). The logger did not relaunch in July. However, instantaneous measurements were taken in the summer at the mouth of Deadhorse Creek. July 15th and August 24th measurements were below the 13 degree C instantaneous temperature standard for salmonid spawning. Thus, instream temperatures met cold water aquatic life temperature standards during spawning season and then throughout the summer.

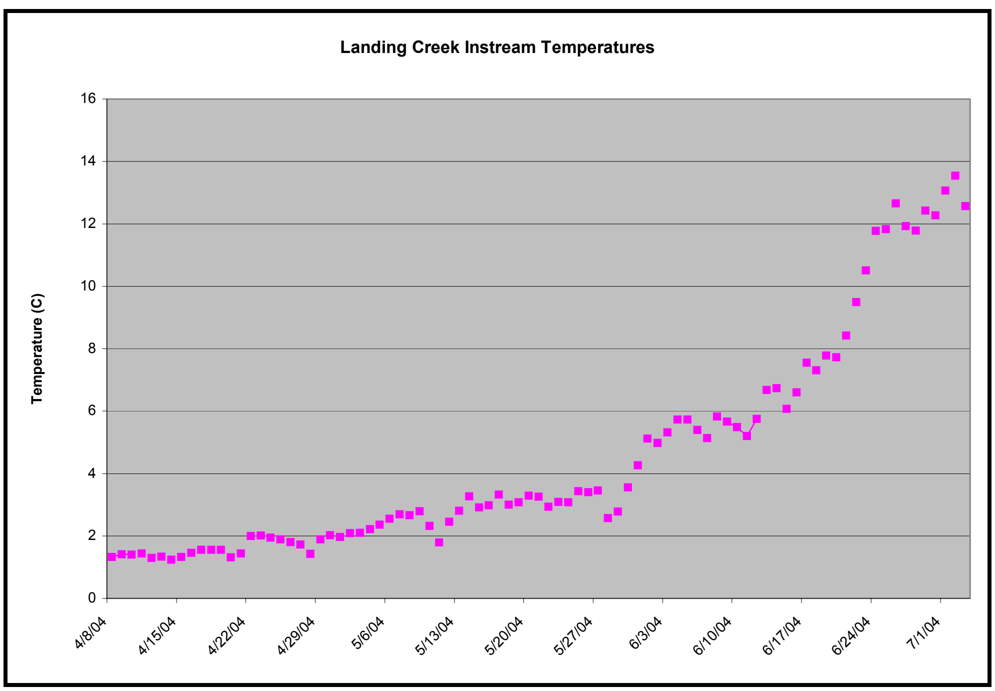

Figure 71. Landing Creek Average Daily Temperature: Spawning Season 2004.

Biological/Habitat Data

Monitoring locations for DEQ are shown in Figure 67. Watershed assessment scores declined between 1994 and 1995, but appeared to rebound in 1998 (Table 31). Since timber harvest had occurred in the Landing Creek watershed after the last DEQ stream inventory was conducted in 1998 in Deadhorse Creek, DEQ staff investigated several habitat parameters related both directly and indirectly to excess sediment delivery. Percent fines, width-depth, large woody debris and bank stability were measured.

Timber harvest is evident throughout the watershed. However, no roads existed near the stream and skid trails were obliterated. Roads within the Deadhorse Creek watershed were graveled and a main access road is gated. Bank stability was typically >90%. The riparian area appeared vigorous. The most recent percent fines scores (Table 32) show percent fine that are close to the 23% reference conditions for a similar Rosgen type B stream as determined by Overton (1995). 2004 bank stability surveys showed greater >85% stable banks. Similarly, width-depth ratios and large woody debris were also within the desired range of conditions (<27 width/depth ratio and > 220 pieces of LWD/mile).

Table 31. Landing and Deadhorse Creek: DEQ Water Body Assessment Scores.

Stream ID	SHI	SMI	SFI	Water Body Assessment Score	Use Support Status
1994SBOIB018	3	No data	No data	---	Not assessed
1995SBOIA047	1	3	No data	2	Full Support
1995SBOIA057	1	3	< min	< minimum	Not Full Support
1998SBOIB031 (Deadhorse Ck)	3	2	No data	2.5	Full Support

Table 32. Landing Creek Percent Fines (DEQ BURP Data).

Stream ID	Location	Percent Fines
1994SBOIB018	Landing Creek	43
1995SBOIA057	Landing Creek	56
1995SBOIA047	Landing Creek	19
1998SBOIB031	Deadhorse Creek	<1
2004 Landing Creek	Landing Creek	17

Conclusions

Landing Creek is listed for an unknown pollutant on the 1998 303(d) list. While anthropogenic activities have likely caused stream disturbance in the past, the stream now appears to be supporting beneficial uses. Sediment was investigated as the most likely pollutant of concern because the habitat parameters related to sediment showed possible impairment and Deadhorse Creek had shown excess sediment loading. Beneficial uses are not impaired in Deadhorse Creek and sediment does not impair beneficial uses in Landing Creek. DEQ recommends de-listing Landing Creek in the next 303(d) cycle. No TMDL is required.

Round Valley Creek

Round Valley Creek is a 3rd order stream originating at 5,200 feet and flowing 6 miles through pastureland before tumbling down the Highway 55 Canyon to enter the North Fork Payette River above the Rainbow Bridge (Figures 72 and 73). Round Valley Creek is a low gradient, Rosgen type C channel where it flows through the meadow portion of Round Valley. Two small 2nd order streams, Chipps Creek and Bacon Creek, are tributaries to Round Valley Creek.